GUNSHOT WOUNDS OF THE INTESTINES; CLINICAL REPORT OF THIRTEEN CASES; REMARKS ON THE DIAGNOSIS AND TREATMENT.

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OUR current medical literature abounds in clinical reports of cases of surgical laparotomy in the treatment of gunshot wounds of the intestines, and the wisdom of the operation, under proper conditions, is attested by the increasing proportion of successful results. The guiding principles of all surgical treatment are very simple, and they are universally applicable, at this day, in every province of the human anatomy. The inactive treatment in the management of gunshot wounds of the intestines, pursued in the olden times in the care of all cases, is rapidly becoming obsolete, and the methods of procedure in such cases have been made to conform to the new order of things in modern surgery.

Diagnosis.—The diagnosis of intestinal wounds, in most instances, is attended with difficulty. There are no general symptoms which are positively diagnostic, although many constitutional signs may lead us to a conjectural diagnosis. There may be no evidence of shock, even in a case of very grave lesions, as is well shown in Cases X and XI, presented in this report. Again, in some cases, remedial agents may relieve symptoms which otherwise would indicate serious lesions. On the other hand, the fears of patients and the wild play of their emotions may easily mislead one to overestimate the character and the extent of the injury. So, there are many conditions which make the general symptoms inconclusive.

The ordinary local signs are by no means infallible in the precise diagnosis of internal abdominal injuries. Pain in some

part remote from the track of the ball, usually referred to the umbilical region, is a valuable sign, but not positive. The evacuation of blood from the bowel is quite a sure symptom, but it does not occur early enough for our diagnostic purposes. The escape of the intestinal contents from the external wound is a crucial test, but this occurs very rarely. The diagnosis must be made immediately and positively. The most positive means at our command to-day are the hydrogen-gas test and exploratory laparotomy. The inflammable gas test is not always conclusive. Wounds of the intestines may exist and yet escape recognition by this method of diagnosis. Again, the concurrent escape of the intestinal contents with the gas and extravasation in the peritoneal cavity is an accident which may seriously complicate the case. The wounded intestines, as a rule, lie stunned in the cavity, so much so that we have rarely found much extravasation from the intestine in any case. Now, it is very desirable to avoid fæcal escape into the serous cavity and hence the necessity of very mature deliberation before adopting any diagnostic means which may prejudice the success of the case.

Exploratory laparotomy offers, in our judgment, the quickest and the safest method of positive diagnosis. The emergency warrants a decisive step. In any case of gunshot wound of the abdomen, one is safe in assuming that the intestines have been injured if the missile, delivered at short range, has penetrated the anatomical regions overlying this part of the alimentary canal, and especially so if the wound is located over the regions occupied by the small intestines. In such cases it has been our custom to follow the parietal wound with a probe so as to verify the entrance into the peritoneal cavity, and then to perform an exploratory laparotomy. The incision is made tentatively and very cautiously for diagnostic purposes. It is enlarged if indicated by conditions existing within and if necessary to facilitate any internal operative work. The exceptional cases in which a bullet may enter the middle and lower regions of the abdomen, without perforating the intestine, are too rare to deter one from the operation through fear that he may perform an unnecessary abdominal section. Only once in follow

ing the rules herein announced have we failed to discover wounds of the intestines in a case of gunshot wound of the abdomen penetrating and transversing the regions occupied by the small bowel. This case recovered.

Surgical Treatment.—The diagnosis of a gunshot wound of the intestine having been made, the advisability of active surgical treatment is, at this day, without controversy. The technique in special cases may vary, but the principles of treatment remain the same. Our methods are very simple and the following are the rules usually observed:

(1) The preparation should be as complete as possible so that the surgical work may be done with all possible dispatch. Everybody and everything concerned in the operation should be surgically clean. The risks are minimized by engaging the smallest possible number of assistants. Only sterilized water is allowed, and this is used freely not only for cleansing purposes, but as a means of stimulation during the shock attending the operation.

(2) The median section, whenever practicable, is advocated and this should be sufficiently free to facilitate thorough exploration and all necessary operative work. The operator should be enabled to see what he is doing.

(3) The exploration of the abdominal cavity should be systematic. The intestines should be passed in review from one end to the other, and special examinations should be made of all organs contiguous to the bullet's track.

(4) The vessels should be ligated and all intestinal wounds sutured with sterilized silk. The material can be made aseptic and perfectly innocuous, and it holds more securely than any other. The interrupted Lembert's sutures should be passed in the direction of the longitudinal fibres. This method best obviates contraction of the calibre of the gut.

(5) The peritoneal cavity should be cleansed by hand, by aid of a full stream of hot water poured from a bowl or pitcher. Any amount of clean water or blood remaining does less harm than the irritation caused by sponging the cavity dry. We do not, as a rule, employ sponges or other absorbent material in cleansing the cavity.

(6) The abdominal section should be closed with the silver wire or the silkworm-gut, which gathers up the peritoneum with the main sutures. The superficial structures should be closed by intermediate sutures of material most easy of application, preferably fine silk or the silkworm-gut.

(7) The superficial wound should be dressed with light, aseptic material, the absorbent gauze and cotton being used more generally.

The technique of this operation should not only be perfectly understood, but every detail anticipated and executed with care. In no class of cases, perhaps, does practice so improve the statistics.

All of the cases, herein reported, were treated in the Charity Hospital, at New Orleans, with the assistance of the resident medical staff. Some of them, as stated in their individual history were transported into the city by railroad and were submitted to us for operation under the disadvantages incident to the delay as well as to the risks of travel. The condition of some of these patients at the time of the operation seemed almost desperate. However, whenever the condition of the patient warranted the belief that he would survive the operation, we operated in the conviction that, if alive after the operation, the chances of living would be improved thereby. The following cases are presented in the order of their occurrence, with such comment as the clinical history of each may suggest.

CASE I.—*Gunshot Wound of the Abdomen, with Seven Perforations of the Small Intestines; Laparotomy; Enterorrhaphy; Death.*—W. F. H., white, aged thirty years, was by occupation the driver of a beer wagon and accustomed to drink about thirty glasses of beer every day. He received his wound on March 9, 1890. Enterorrhaphy was performed within an hour after the injury and the seven intestinal perforations were sutured, as described in the prefatory title. The patient gradually became asthenic and died March 14 following. The autopsy revealed the seven intestinal wounds perfectly healed. The local conditions were inadequate to explain the cause of death. The alcoholic stimulants, in the quantity to which the man had been accustomed, had been withdrawn, and the nutri-

ment offered was less familiar to the patient's tissue and evidently insufficient to sustain life. More generous feeding in this case would have been a wiser plan of treatment. In the management of a similar case, we would advise, in addition to the necessary food, the continuance of the alcoholic liquors, on which the tissues were accustomed to feed. The liberal use of Ducro's elixir, or the liquid peptonoids, by the large bowel, may answer a good purpose in such a case.

CASE II—*Gunshot Wound of the Abdomen, with Sixteen Perforations of the Small Intestines and Three Wounds of the Mesentery; Laparotomy; Enterorrhaphy; Recovery.*—The following is an abstract of the report in Vol. III, *Transactions of the Southern Surgical and Gynecological Association*, 1890.

F. H., white, aged thirty years, on September 11, 1890, accidentally inflicted a gunshot wound of the abdomen, a thirty-two calibre bullet entering at a point midway between the umbilicus and the pubes, opening the small intestines in sixteen places and wounding the mesentery in three places. There were evidences of shock, but not in extreme degree; his pulse beat 108 per minute. Within half an hour after the accident the man was conveyed to the hospital in the ambulance and submitted for operation. Upon exploratory abdominal section the condition above described was revealed. The intestines were practically empty, which explains the large number of intestinal wounds. Enterorrhaphy was performed as quickly as possible. On the evening of the following day the temperature rose to 102° F., the pulse to 150 per minute. These changes were attributable to some imprudence in feeding. Ten grains of antipyrine, administered hypodermatically, controlled the fever. On several occasions subsequently the temperature exceeded 101° F., but the usual range during the confinement in bed was about 99° F.

In these cases of intestinal wounds a rise in temperature easily follows indiscreet feeding. The pulse in this case was usually in accord with the temperature, but during the second week often ranged between 150 and 160 per minute. Such a pulse in any case calls for stimulation. From the second to the seventh day after the operation the patient was nourished exclusively by rectal alimentation. Such precautions in feeding as forbid alimentation by the stomach for five days are rarely necessary. The patient remained in the hospital from September 11 until October 18, and was then discharged, his alimentary functions being normal in every respect.

CASE III—*Gunshot Wounds of the Abdomen, with Twenty-one Perforations of the Intestines; Laparotomy; Enterorrhaphy; Death.*—Louis F., colored, aged thirty-three years, on January 25, 1891, received two wounds of the abdomen, inflicting twenty-one wounds of the intestines. The patient's condition was unfavorable. The operation above outlined was performed with all possible dispatch, but the patient died of shock on the same day.

CASE IV—*Gunshot Wound of the Abdomen, with Eleven Perforations of the Intestines; Laparotomy; Enterorrhaphy; Death.*—Joseph H., colored, aged forty-nine years, was admitted to the Charity Hospital, suffering as above described, and died two days later, on March 16.

The patient was conveyed to New Orleans by rail from one of the rural parishes of Louisiana, and at the time of the operation presented conditions unfavorable to a successful result. In cases of doubt as to the advisability of the operation, we give the patient the benefit of the doubt and operate.

CASE V—*Gunshot Wound of the Abdomen, with Eleven Perforations of the Intestines; Laparotomy; Enterorrhaphy; Death on the Fifth Day.*—Alf. M., aged thirty-two years, was admitted into the Charity Hospital on December 26, 1891, suffering as above described. The usual operation was performed, and the patient died of peritonitis on the fifth day.

CASE VI—*Gunshot Wound of the Abdomen, with One Intestinal and One Mesenteric Wound; Laparotomy; Enterorrhaphy; Recovery.*—George T., a negro of slender but strong physique, aged thirty years, was admitted into the Charity Hospital on March 31, 1892. At one o'clock P.M. on this day the patient received his wound. The thirty-eight calibre ball, delivered at short range, entering at a point midway on a line drawn between the anterior and posterior superior spines of the ilium, passing through this bone and penetrating the abdominal cavity, wounded the mesentery of the small bowel and lodged within the transverse colon immediately behind the linea alba. At the time of admission the patient's surgical condition was fair; his suffering, however, was intense. Five hours after the accident he lay on the table prepared for laparotomy. He complained bitterly of abdominal pain, referred to the umbilicus. This is a pretty sure indication, under such circumstances, of a serious internal injury. The operation began with a short tentative incision between the navel and the pubes, only large enough to verify the diagnosis of

an internal injury. Blood welling up through the little incision was conclusive evidence. The incision was quickly enlarged sufficiently to enable us to track the bullet and repair the injuries inflicted. The mesenteric vessels were bleeding freely. The quantity of blood in the peritoneal cavity was considerable. Only one intestinal perforation was found, and that on the under surface of the transverse colon near which the bullet had lodged in the bowel. The peritoneum showed evidences of universal inflammation that had existed in the past. There were many adhesions, and in several places observed the small intestines were welded together and much distorted. The cause of this condition will be explained hereafter. The patient reacted from the operation very satisfactorily, and recovered without any untoward symptoms, the temperature after the first record never exceeding 100° F., and the pulse never rising beyond 105 per minute.

Two years prior to the accident above recorded this patient received a gunshot wound of the abdomen. The muzzle of a forty-four calibre pistol resting against him delivered a ball which entered between the ninth and tenth ribs, midway between the axillary lines. He remained in this hospital under treatment for this accident for thirty-one days, and suffered from general peritonitis and its consequences. This wound explained the intestinal adhesions, above described, and the intense colic of which the patient has occasionally suffered.

The subject of the above sketch is certainly an excellent one for abdominal work, having recovered of two very serious gunshot wounds of the abdomen, one treated by the old plan of inaction, the other by the more modern active measures. It may be said that a patient of his previous record would most probably have recovered of his second wound without surgical interference. Surely the operation was his preservation in the second instance, for the hæmorrhage from the mesenteric vessels, which were bleeding freely at the time of the operation, would have resulted fatally.

CASE VII.—*Gunshot Wound of the Abdomen, with Three Wounds of the Intestines and One Mesenteric Wound; Laparotomy; Enterorrhaphy; Recovery.*—Charles N., white, aged forty-two years, attempted suicide on May 7, 1892, between seven and eight o'clock, by inflicting a gunshot wound of the abdomen. The ball, of large

calibre, entered on a transverse line touching the lower border of the costal arch and one inch to the right of a line drawn down from the left nipple, passed once through the mesentery and wounded the small bowel in three places.

Immediately after this attempt the man threw himself into the Mississippi River in further effort at self-destruction. At 11 o'clock P.M., three or four hours after the occurrence, the patient was conveyed to the hospital and prepared for laparotomy. After exploration and a positive diagnosis, enterorrhaphy was performed and the peritoneal cavity cleansed of a considerable quantity of blood. The patient reacted quickly and satisfactorily. Cracked ice in quantities of a teaspoonful was administered every hour from the time of the operation. This treatment is at variance with our rule, which usually forbids the reception into the stomach of anything during the first twenty-four hours after the operation; but this concession, to satisfy the demands of a most obstreperous patient, resulted not in the least harmfully. The man seemed determined upon self-destruction. Twenty-four hours after the operation beef-tea and chicken-tea in quantities of half an ounce were administered at intervals of two hours. On the following day one or the other of these articles of food was given alternately with a tablespoonful of Ducro's elixir. The bowels moved voluntarily on the sixth, seventh, eighth and ninth days after the operation. This case terminated favorably and in every way satisfactorily. The highest temperature point recorded at any time was 101⅕° F.; the corresponding pulse-rate 135 per minute.

CASE VIII.—*Gunshot Wound of the Abdomen, with One Perforation of the Intestine; Laparotomy; Enterorrhaphy; Death on the Second Day.*—Mike R., a negro, aged twenty-four years, was admitted into the Charity Hospital May 12, 1892, suffering from a gunshot wound of the abdomen, peritonitis and intestinal obstruction; pulse, 130; respirations, 39 per minute; temperature, 103° F. There was stercoraceous vomiting, the symptoms of impending collapse were present, and altogether the condition was very unfavorable. The wound was inflicted forty hours before admission, and when the patient came under our observation death seemed inevitable in a short time. However, the operation of laparotomy was attempted as a last resort. The intestine was wounded in but one place, as it lay immediately behind the linea alba midway between the umbilicus and the pubes. The ball notched the convexity of a coil of the small bowel and then lodged in the recto-vesical cul-de-sac. The localized

peritonitis circumscribed a fæcal accumulation. Here the bowel was obstructed, and the local as well as the general symptoms appeared as unfavorable as possible. During the operation, which was quickly over, the patient's condition improved under forced stimulation. The reaction, however, was only partial, and the patient died at 3 o'clock on the following morning.

After the accession of peritonitis in these cases of abdominal wounds an operation, in our experience, is almost futile. We have not yet seen a case of gunshot wound of the intestines, with general peritonitis, recover after laparotomy and enterorrhaphy. The case above cited teaches how a patient in collapse can be revived for the time by douching the peritoneum with hot water. Shock does not forbid the operation of laparotomy in such emergencies as illustrated by these cases. Hot douches of the peritoneum are most potent means of exciting reaction. Moreover, shock in cases is often caused by the loss of blood from the visceral vessels, an accident which only the abdominal section can enable us to repair. These words are written to emphasize the necessity of an immediate operation in those cases where the location and nature of the wound are such as to give us reasonable hope of being able to repair the injury within. Under the influence of ether and other volatile heart stimulants the symptoms often improve during the operation.

CASE IX.—*Gunshot Wound of the Abdomen, with Five Perforations of the Intestines and Three Wounds of the Mesentery; Laparotomy; Enterorrhaphy; Death on the Second Day.*—Thomas F., white, aged fifty-six years, a police officer, was wounded in the discharge of his official duty, the muzzle of the pistol resting against the abdomen at the instant of explosion. The wounded man was conveyed to the hospital promptly, and within one hour he was prepared for laparotomy. All the surgical indications were plain, and the operation was done quickly. The patient took the anæsthetic badly. He was an alcoholic subject, and poorly prepared to withstand such a surgical ordeal. The walls of the abdomen were thick with fat. The patient never rallied completely from the operation, and died on the 10th of August, two days after the accident.

CASE X.—*Gunshot (bird-shot) Wound of the Abdomen; Lapa-*

rotomy; Twenty (sutured) Perforations of the Intestines; Death.—C. T., white, aged twenty-four years, while game hunting, discharged both barrels of his shot-gun, charged with bird-shot, into the right iliac region. The missiles ranged upward and toward the left side, wounding the intestines and mesentery in many places. The man was greatly shocked, but his condition, in our judgment, did not forbid the operation. While his case appeared desperate, we felt that his time while living could not be better spent than in an attempt at his preservation by the only method that promised any chance for life. The gun-wads were removed from the peritoneal cavity with masses of clotted blood, and the larger ones of the intestinal wounds were sutured. The patient died in collapse five hours after the operation.

CASE XI.—*Gunshot Wound of the Abdomen; Fourteen Perforations of the Small Intestines, mostly of the Jejunum; Laparotomy; Enterorraphy; Recovery.*—C. A. T., colored, aged twenty-four years, a man of ideal physique, temperate habits, except on holidays, and previous good health, received a gunshot wound of the abdomen on the morning of October 30, 1892. The accident occurred at eight o'clock A.M., near a railroad station several hours distant from New Orleans. The wounded man was conveyed in a horse-cart, three-quarters of a mile, to the nearest station. From the New Orleans depot he was conveyed to the hospital in the City Charity wagon. At the time of admission he was in agony and complained piteously of the abdominal pain. He received at once morphine sulphate gr. ¼, hypodermatically. Relief came promptly, and while the preceding case was under the operation the man fell asleep. Ten hours after the accident, after pretty rough travel and in a variety of vehicles, the patient was submitted for the operation. The brand of the weapon employed and the calibre of the bullet were unknown. The intestinal perforations were of large size, easily admitting the point of the index finger. Fortunately the intestines were practically empty, as the wound was received before breakfast. The wounds were in all sorts of positions in the circumference of the bowel, most of them involving the jejunum. When presented for operation the patient was perfectly relieved of pain and disposed to sleep; pulse, 66 per minute. No surgeon, whatever his experience, would have suspected such serious lesions as existed within. The usual mode of tentative action was adopted. An exploratory incision revealed blood in the peritoneal cavity, and through the crevice the intestinal

wounds were soon discovered. The usual operation followed. All the wounds of the intestines were sutured carefully and the cavity put in order and closed.

All went well until the morning of the seventh day, when the temperature reached 101° F., and the pulse 160 per minute. We realized the necessity of more active stimulation and more nutriment. Under the more generous treatment all the untoward symptoms disappeared. Gas escaped through the bowel on the third day, and on the seventh there was a natural evacuation. From this time the case progressed favorably, and was discharged cured on the 1st of January, 1893. The recovery of this case is the more remarkable in view of the hardships endured before admission into the hospital, and during the interval of ten hours which elapsed from the time of the accident until the operation. Again, it furnishes a useful lesson in showing how a wound of such gravity may be concealed by favorable symptoms. The perfect recovery of this patient, without a sequel causing the slightest inconvenience, is a fact worthy of record.

CASE XII—*Gunshot Wound of the Abdomen; Ten Intestinal Perforations Involving the Jejunum Mainly; Laparotomy; Enterorrhaphy; Recovery.*—Charles C., colored, aged twenty-one years, on December 13, 1892, received a gunshot wound of the abdomen. The bullet entered on the left side, one inch to the right of the mammary line and two inches below the costal arch, and, ranging toward the right, wounded the jejunum in ten places and lacerated the omentum extensively. The intestinal wounds were the largest that have ever come under our observation in similar cases, many of them easily admitting the index finger. One of these wounds lacerated more than one-half of the circumference of the bowel. The mesenteric wounds had bled profusely, and as soon as the intestines were disturbed in the search for the perforations the hæmorrhage was renewed, and the loss of blood was very considerable before the wounded vessel could be located and ligated. The pulse before the operation was 82; during the operation it ranged from 105 to 128 per minute, until suddenly it ceased at the wrist. The saline infusion was employed in the emergency, and about one pint of a solution, containing one drachm of common salt to the pint of sterilized filtered water, was injected into the median basilic vein. The immediate stimulation by this procedure was the patient's preservation. Immediately thereafter the pulse beat 96 per minute. One hour after the operation his pulse was 105. This patient now entered upon a

very stormy clinical career. On the third day the temperature reached 102.5° F., and ranged above 101° F. for five days. During the following thirteen days it reached or exceeded 101° F. on four different occasions. On the 3d of January the temperature commenced to rise to 100° F. every evening. This continued provokingly for six days, when the wound of entrance was opened to give escape to an intra-mural abscess. In the meantime the pulse behaved wildly, during one week in the early part of the history ranging above 110 per minute, and on one occasion, without provocation, reaching 140. The respirations for four days were 40 per minute; and during all these ominous days the patient was much distressed by hiccough.

On the second day gas escaped naturally from the bowel, and on the fifth day there was a voluntary intestinal action. During the time of confinement in bed the patient suffered very much of intestinal colic. This was temporarily relieved by the the use of saline purgatives. The extensive laceration of the bowel, above mentioned, and the wound of the contiguous mesentery necessitated some constriction of the bowel, and this explained the cause of the suffering. Even after the patient's discharge from the hospital he complained of occasional colic, intense in character. The patient is under instruction to return for further surgical treatment should the pain persist in returning, and, especially, should it increase in severity. Four months have elapsed since the operation, and as the patient has not reported recently, we infer that matters are going on more smoothly as the time advances.

This case we considered the most important from a surgical standpoint of all those which have come under our observation. All of the ten wounds of the small intestines were of large size, most of them easily admitting the end of the forefinger. There was extravasation of the intestinal contents in the peritoneal cavity, but, as most of these wounds were jejunal, the loose matter was less noxious to the serous membrane than more offensive fæcal contents. The perilous history of the patient, as narrated in the after-treatment, lends additional interest to this case.

CASE XIII—*Gunshot Wound of the Abdomen; Six Perforations of the Small Intestines, With Peritonitis; Laparotomy; Enterorraphy; Death.*—W., colored, was admitted into the hospital on February 5,

1893, eight hours or more after the accident, and declined the proposal of an operation until the morning of the following day. The exploratory laparotomy revealed general peritonitis, which had intervened upon the intestinal injury described in the caption of the case. The usual reparative operation was performed, and the patient died on the following day. It has not yet been our fortune to rescue such a case after the access of general peritonitis.

Of the thirteen cases reported, all but one were wounds of the small bowel, and most of them were wounds of great gravity. The mortality of eight in thirteen cases may seem quite a high death-rate, but we feel quite confident that the results would have been much more disastrous if operative surgical aid had been withheld. If no other argument was available to sustain the wisdom of the operation in these cases, the recovery of the three patients, one suffering of sixteen wounds of the small intestines, one of fourteen, and another of ten, would surely be sufficient.

After-treatment.—The after-treatment in cases of gunshot wounds of the intestines ranks co-equal in importance with the operative procedure.

Foods and Feeding.—During the first twenty-four hours we allow only cracked ice and Ducro's elixir, in quantities ranging from two to four drachms, and at intervals varying with the intensity of thirst and the necessity of stimulation. Some cases receive nothing into the stomach during the first twenty-four hours. If the state of the general nutrition does not require the stimulant, it is not administered until the pulse indicates the necessity. The urgency of stimulation is the greater in those patients, whose intestines were empty at the time of the accident, and especially in those who have lost strength by hæmorrhage. In all cases the use of stimulants in the latter part of the first week and the beginning of the second is a matter of great importance.

On the second day we begin with chicken-tea (℥ss–℥j) at intervals ranging from two to four hours. The quantity and the intervals must be determined by the exigencies in each case. The quantity of the food must be modified by the proximity of

the intestinal wounds to the stomach. In jejunal wounds the risks of early and generous feeding are greater. The other articles of food usually employed and allowed in quantities suitable to the local conditions, are beef-tea, soft-boiled eggs, boiled milk with lime water. The tender meats in small quantity and well cooked farinaceous foods are allowed in the second week. The quantity of these foods and the intervals must be determined by the conditions presented in individual cases. The alcoholic stimulants, especially those preserving the nutrients, as Ducro's elixir and the liquid peptonoids, may be given throughout the after-treatment, in quantities suitable to each case. These readily oxidizable agents so easily sustain patients and, moreover, they enter the circulation quickly without disturbing the intestinal wounds. The alcoholic stimulants are absolutely indispensable to those who are accustomed to their use. Attention to this particular point is of much importance.

In the after-treatment of these cases, rectal alimentation with the predigested foods and alcohol, in proportions varying according to the indications and at intervals regulated by the demand, is a matter of great importance. In all the cases above reported, the little nutriment allowed by the mouth was supplemented by rectal feeding. In one whose condition forbade the use of food by the stomach, the lower bowel alone sustained life long enough to tide the patient over the crisis. In Case II the patient was sustained by rectal alimentations for five days. In feeding these cases of intestinal wounds our purpose is simply to sustain life within safe bounds until the canal can resume its functions. Over-feeding easily proves disastrous. It requires but little food usually to tide patients over the first week. No symptom guides us so well as the pulse in determining the amount of food necessary. The fast and gradually failing pulse shows the hunger of the tissues.

Heart-stimulants.—The digitalis tincture (℥xv), brandy (℥j), strychnine sulphate (gr. $\frac{1}{60}$–$\frac{1}{40}$), atropine sulphate (gr. $\frac{1}{100}$) are the agents which have usually been employed in the cases reported. The first three named, having a general action as stimulants, are universally applicable, while the atropine sulphate, acting specially, has rendered special service in conditions of

collapse and copious sweating. The exhausting sweating of a patient, weakened by hæmorrhage or shock, is relieved in most instances by the hypodermatic injection of gr. $\frac{1}{100}$ of the sulphate of atropine. In some cases this heart-stimulant is invaluable. All of these agents commended should be administered hypodermatically and repeated for the desired effect.

Antipyretics.—Septic fevers must be relieved by surgical measures if indicated. The fevers of nervous traumatism are best relieved by the carbon compounds of the aromatic series. The hypodermatic use of antipyrine is one of the most efficient measures in combating an irritative fever.

In most of the cases herein reported, the after-treatment comprised judicious feeding and the hypodermatic administration of the heart-stimulants as required.

Contra-indications.—The use of the opiates, as a rule, does harm. The paresis of the intestinal coats caused thereby, with its train of ills, should alone forbid the use of opium. The disturbance of the patient's nervous equilibrium leads often to serious complications. It is exceptional in our surgical service to administer an opiate in any quantity in the after-treatment of these cases of intestinal wounds.

Much harm may be done by the early use of purgatives. True the wounds, as a rule, are solidly healed during the first week, yet the healing may not withstand the action of a purgative. It is wise, in our judgment, to allow the bowels to move voluntarily, with, perhaps, the encouragement of an occasional enema during the second week.

A glance at the list of cases, herein reported, shows an improvement in our statistics with the increasing number of cases. Two of the last three cases were saved, and of these one had fourteen perforations of the small intestines, the other ten, inflicted with bullets of large size. The fatal case of the three had already developed general peritonitis. If the operation of enterorrhaphy be done before general peritonitis supervenes and done quickly, cleanly and thoroughly, with judicious after-treatment, the patient has more than even chances for recovery now, and surely these chances will be improved with the coming years.